

MSON COURSES 2013-2014

Language Offerings

Arabic One

Instructor: OSH, Stanford University, Palo Alto, CA

This course is an introduction to Modern Standard Arabic, the language of formal speech and most printed materials in the Arab-speaking world. Students will learn to read and write the Arabic alphabet and will develop beginning proficiency in the language. Through frequent oral and written drills, students will develop their basic communication skills.

Starting the week of September 3: Time to be determined

Chinese One

Instructor, Ying Xia Peterson, The Derryfield School, Manchester, NH

This course is an introduction to modern Mandarin conversation and written Chinese, which primarily includes two parts: Chinese pronunciation (pinyin) and Chinese characters. Students will be involved in a systematic study of pinyin, Chinese characters, and the basic elements of grammar and sentence structure. Students will practice the four basic language skills through frequent oral drills and a series of communicative activities. In addition, students will be introduced to the history and customs of Chinese culture.

Starting week of September 3: Monday and Wednesdays, 2:30-3:30 EST (if Monday is a holiday, the following Tuesday will usually be the make-up class)

Chinese Five (Language and Literature)

Instructor: JianMin Luo, Chadwick School, Palos Verdes Peninsula, CA

Prerequisite: Completion of Chinese 4 or 4 Honors

Chinese 5 is designed for intermediate level Chinese learners to further improve their overall proficiency in the four skills of the target language. This college-level course emphasizes on applying Chinese language and cultural knowledge in real-world problem solving. It will explore the knowledge and skills of effective communication in a modern contextual Chinese language setting. Authentic resources includes news and articles, movies and TV shows, essays and speeches, daily scenes and conflicts, social cues and popular proverbs, etc. A variety of advanced tech tools and constructive activities focusing on discussion and argumentation will enhance students' social skills and cultural understanding. This course is conducted in Chinese. Texts: 1. Liu LiXin, Deng Fang, *Home With Kids (Textbook with Videos)*, Foreign Language Teaching & Research Press, *Travel in Chinese*, Zhao YunHui, Liu XiaoYu, *Learning Chinese Through Movies*, ISBN: 9787510017933 9787510017926, Additional authentic materials and Internet resources

Starting week of September 3: Monday/Wednesday 4:30 – 5:30 EST (if Monday is a holiday, the following Tuesday will usually be the make-up class)

Humanities Offerings

Democracy, Freedom, and the Rule of Law

Instructor: OSH, Stanford University, Palo Alto, CA

This year-long course examines the foundations of civil society. Drawing on both historical and theoretical materials, the students study changing conceptions of how a state is and should be organized. In particular, we focus on different treatments of the interwoven concepts of democracy, freedom, and the rule of law. As part of their study, students practice the methodological tools of analysis relevant to philosophy and political theory, learn to formulate and evaluate hypotheses about the content of critical concepts, and develop a thorough knowledge of their political traditions and principles. These lessons contribute to the broader aim of the course, which is to prepare students for citizenship in their community by refining their ability to participate constructively in the discourse that draws on these conceptions of the state. While the course is organized around principles of American government, the readings are germane to democratic society generally. Readings include Hobbes, Locke, Rousseau, Montesquieu, Madison, Jefferson, American founding texts, Lincoln, Addams, King, Burke, Tocqueville, Smith, Dewey, Mill, Berlin, Rawls, Nozick, Sandel, Sen, McMillan, Marx, Dicey, and Hayek.

Starting week of September 3; time to be determined

Making *Moby-Dick* (1st Semester Course)

Instructor: OSH, Stanford University, Palo Alto, CA

What is *Moby-Dick*; Or, *The Whale*? Is it an adventure story, a revenge story against a monster whale? Is it a novel investigating American identity in race and in national promise and revolution? And what about the tragedy of this tale? Only one whaleman lives. Does Melville write a tragedy in the vein of Shakespeare? How does this book matter? ‘Making *Moby-Dick*’ takes on a series of critical questions in four crucial settings. The first setting is the New England contexts of American literature in the 1840s—seen in the writings of Emerson, Hawthorne, and Melville—while the second setting turns to Edgar Allan Poe’s and Mary Shelley’s model adventure tales, of the sea and of the ‘monster.’ Our third setting is the *Moby-Dick* itself and our extended reading of the tale. The fourth and final setting lays out the argument that there are actually ‘two *Moby-Dicks*’ and that Melville’s reading of Shakespeare’s tragedies plays an essential role to deciphering the novel’s composition. Students gain the critical skills needed to interpret, and to answer, what the novel *Moby-Dick* is, or does.

Starting week of September 3; time to be determined

Topics in Ottoman History (1st Semester)

Instructor: William Milsten, Trinity Preparatory School, Winter Park, Florida

The purpose of this one semester course is to introduce students to the fascinating world of the Ottoman Empire, its history and culture, while exposing them to Ottoman food, music, architecture, religion, politics, poetry, and art. This course will cover the rise of the Ottoman Empire from its humble nomadic beginnings, through the conquest of Constantinople, the Imperial Age of Istanbul, the Sultanate of the Women, and its decline and collapse. This course will require nightly reading assignments, several papers, and an historical-fiction writing piece that will allow students to explore their creative sides. Required Books: Goodwin, Jason. *Lords of the Horizons: A History of the Ottoman Empire*. New York, NY: Picador, 2003. Pamuk, Orhan, and Erdağ M. Göknar. *My Name Is Red*. New York: Alfred A. Knopf, 2001

Starting week of September 3: Tuesday/Thursday 1:00 – 2:00 EST

STEM Offerings

Advanced Computer Programming

Instructor: OSH, Stanford University, Palo Alto, CA

Data Structures and Algorithms in Java: this year-long course continues and deepens students' understanding and practice of object oriented programming. Students are expected to have familiarity with programming in Java at the AP Computer Science A level. Core topics in the context of the Java programming language include practical implementations of fundamental and more advanced data structures (linked lists, hash encoded storage, binary search trees - AVL, treaps, red-black trees, and heaps), algorithms for organizing and manipulating data (including sorting, searching, and traversal algorithms), and time complexity of algorithms in a problem-solving oriented context. In-depth exploration of standard Java libraries and features such as Java Collections, error handling, threads, and designing and building graphical user interface using AWT and Swing libraries is included. Much of the course is project-based, with assignments stressing the design of classes and algorithms appropriate to a particular problem.

Prerequisite: AP Computer Science or the equivalent (with approval of the instructor).

Starting the week of September 3: Time to be determined

Advanced Abstract Math (1st Semester)

Instructor: Justin Fitzpatrick, PhD, University School of Nashville, TN

This course will be a student-driven elective for those interested in learning topics outside the standard mathematics curriculum, as well as learning topics already within the curriculum at a deeper level. At the beginning of the course will be a brief unit on proof techniques. After a short time, students will be expected to turn in a list of several mathematical topics about which they would like to learn more. The instructor will then choose from these topics in such a way that they form a somewhat cohesive unit and collect input from as many students as possible. We will devote the remainder of the semester to studying these topics. Topics from previous semesters include fractal geometry and dimension, Cantor's set theory, number theory, cryptography, power series, and Fibonacci numbers, to name a few. The only prerequisites for this course are a solid background in algebra and a thirst to satisfy mathematical curiosity. A few times throughout the term, problems will be assigned for homework. At a later class session, the instructor will ask for student volunteers to share their solutions. These solutions will be evaluated in terms of accuracy both in writing and in spoken communication as both of these skills are of paramount importance to the budding scientist or mathematician! Students may also be asked to turn in a written solution to a given problem, which will be evaluated similarly. Starting week of September 3: Tuesday/Thursday 2:30 – 3:30 EST

Advanced Topics in Chemistry (2nd Semester)

Instructor: David Walker, Maret School, Washington DC

This semester course explores real-world applications to chemistry that are often skimmed over or omitted in most chemistry courses. Possible topics include nuclear, medical, atmospheric, industrial, food, water, and consumer product chemistry. Learn how a nuclear power plant works, how fuels are chemically altered for vehicles, what chemicals are added to drinking water and why they are added, how ores are processed into useful products, and why a country's standard of living can be determined by its production of chlorine or other important chemicals. We'll explore the periodic table for daily applications and technologies, from cell phones to photovoltaic cells to medical treatments. This course

will be heavy in applications and theory, leaving out much of the problem solving found in other courses.

Starting week of January 6: Monday and Friday, 2:00 – 3:00 EST (if Monday is a holiday, the following Tuesday will usually be the make-up class)

Introduction to Organic Chemistry (1st semester)

Instructor: David Walker, Maret School, Washington DC

This semester course will provide useful background information in organic chemistry by covering topics not typically found in high school chemistry courses. The course will give insight into the importance of the chemistry of carbon compounds to our daily lives. Topics covered will include organic nomenclature, structural formulas, stereochemistry, bonding, reaction mechanisms, chemical transformations of functional groups, and instrumental isolation and detection techniques. Applications to the life sciences (chemistry of proteins, nucleic acids, medicines, and natural products), biochemical applications to medicine, industrial applications, and environmental applications will be explored. Completion of the course should make students more confident in their chemical background when entering college biology or chemistry courses.

Starting week of September 3: Monday and Friday, 2:00 – 3:00 EST (if Monday is a holiday, the following Tuesday will usually be the make-up class)

Meteorology (2nd Semester Course)

Instructor: Edward Chiang, Canterbury School, Fort Wayne, IN

Prerequisite: Chemistry

Meteorology is the study of the Earth's atmosphere. Although weather is only one aspect of meteorology, it will be the main focus in this class. The role of moisture, vertical motions, jet streams, mid-latitude cyclones, and frontal systems in producing our weather will be covered. We will also study thunderstorms, tornadoes, and hurricanes. We will learn about climate change and global warming if time permits.

Starting week of January 6: Tuesday and Thursdays, 5:00 to 6:00 EST

Multivariable Calculus

Instructor: Blake Spraggins, Maret School, Washington, DC

Prerequisite: Completion of BC Calculus

The mathematics of three dimensions is the emphasis of this college-level course. Multivariable Calculus will explore the geometry of three-dimensional space, including vector arithmetic. It will also explore three-dimensional surfaces, using the tools of derivatives and integrals expanded into multiple dimensions. A robust unit on differential equations will allow us to review the topics of single-variable calculus. The emphasis throughout the course will be on problem-solving and on real-world applications of the tools we learn in fields such as economics, astronomy, physics, engineering, and medicine. Text: Stewart, *Multivariable Calculus* (Fourth Edition)

Starting week of September 3: Monday and Fridays, 1:00 – 2:00 EST (if Monday is a holiday, the following Tuesday will usually be the make-up class)